

REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-30 are presently pending in this application, Claims 15-30 having been newly added by the present amendment.

In the outstanding Office Action, Claims 1-5 and 8-14 were rejected under 35 U.S.C. §102(b) as being anticipated by Holmes (U.S. Patent 4,217,570); and Claims 6 and 7 were rejected under 35 U.S.C. 102 (e) as being anticipated by Bogdanski et al. (U.S. Patent 6,150,636).

Claim 6 has been amended solely to clarify the subject matter recited therein. This claim amendment is believed to be merely cosmetic and is not believed to add new matter nor narrow the scope of the claim.

Newly added Claims 15-30 are believed to find clear support in the claims, specification, and drawings as originally filed. For example, Claims 15 and 23 are supported by the specification, page 7, lines 33-35 and Fig. 1; Claims 16 and 24 by the specification, page 10, lines 11-15; Claims 17 and 25 by the specification, page 11, lines 39-46; Claims 18 and 26 by the specification, page 10, lines 8-9; Claims 19 and 27 by the specification, page 9, lines 42-44; Claims 20-21 and 28-29 by the specification, page 10, lines 2-4; and Claims 22 and 30 by the specification, page 7, lines 8-12. Hence, no new matter is believed to be added thereby.

Briefly recapitulating, Claim 1 of the present invention is directed to a ceramic heater including a ceramic substrate, an insulating layer having volume resistivity higher than that of the ceramic substrate, being formed on at least a part of the ceramic substrate, and a resistance heating element formed on the insulating layer. A ceramic heater drops its volume

resistivity at high temperature and causes a short circuit between circuits. However, by providing such a resistance heating element on the insulating layer, the ceramic heater recited in Claim 1 effectively prevents a short circuit in the resistance heating element even though the ceramic substrate itself has electric conductivity.¹

The outstanding Office Action asserts that Holmes discloses a ceramic heater structure as recited in Claim 1. Nevertheless, Holmes does not teach “a resistance heating element formed on said insulating layer” as recited in Claim 1. On the other hand, Holmes discloses a microcircuit structure including the insulative substrate 22, thin-film resistor 24, and passivation coating including a layer of an oxide 32 and a layer of silicon nitride 34.² The insulative layer 22 is made of glass, alumina, silicon oxide, or the likes, and the thin-film resistor 24 has the pair of terminals 26, 28 overlapping the ends of the resistive film element 30. The Office Action appears to presume that the silicon nitride layer 34 corresponds to a ceramic substrate, the oxide layer 32 to an insulating layer, and the resistive film element 30 to a resistance heating element. However, as Holmes discloses a microcircuit structure, the resistive film element 30 merely provides resistance for an electrical circuit, and clearly is not the heating element for a ceramic heater as recited in Claim 1. In addition, according to Holmes, the resistive element 30 is laser trimmed without damaging the passivation coating, and the oxide layer 32 prevents a reaction between the resistive element 30 and the silicon nitride layer 34, thereby preventing the formation of unstable metal nitrides. The ceramic heater recited in Claim 1 does not require a passivation coating on its resistance heating element. Furthermore, nowhere does Holmes disclose the effects of providing the resistance heating element as discussed above. Therefore, the subject matter recited in Claim 1 is believed to be distinguishable from Holmes and thus is not anticipated thereby.

¹ See specification, page 2, lines 30-34.

² See Holmes, column 2, lines 39-55.

Turning now to Claim 6, Claim 6 of the present invention is directed to a ceramic heater including a ceramic substrate and a resistance heating element formed on a surface of the ceramic substrate, wherein the ceramic substrate is warped in one direction. Because a ceramic substrate has irregular undulation, when a semiconductor wafer is separated from the ceramic substrate at a certain distance and heated, the distance between the two varies, and the temperature of the semiconductor wafer being heated becomes uneven. However, by providing a ceramic substrate as such, the irregular undulation is removed, and it becomes easier to determine the distance between the ceramic substrate and the semiconductor wafer.³ Thus, when the wafer is heated, temperature is more accurately controlled depending on the distance, and the surface temperature of the wafer is made more even.⁴

Bogdanski et al. disclose a cooking system including an electric hotplate, a heating resistor, and a hot plate body of nonoxidic ceramic having a cooking surface. Nevertheless, Bogdanski et al. fail to teach “a ceramic substrate ..., wherein said ceramic substrate is warped in one direction” as recited in Claim 6. On the other hand, Bogdanski et al. disclose the hot plate body including a surface having macro-unevenness and micro-unevenness, i.e., large waves and roughness,⁵ with both unevennesses not exceeding 100 μm . Although the hot plate body of the Bogdanski et al. device has such undulation, in other words, mountains and valleys, the hot plate body is made extremely flat,⁶ and is not warped in one direction as a whole. Furthermore, Bogdanski et al. clearly do not disclose or suggest the aforementioned effects and advantages attributable to the ceramic substrate recited in Claim 6. Therefore, the subject matter recited in Claim 6 is believed to be distinguishable from Bogdanski et al.

³ See Specification, page 16, lines 45-47.

⁴ See id., page 23, Table 1.

⁵ See Bogdanski et al., column 6, lines 51-53.

⁶ See id., column 6, lines 49-51.

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For the foregoing reasons, Claims 1 and 6 are believed to be allowable. Furthermore, since Claims 2-5 and 7-30 depend ultimately from either Claim 1 or 6, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 2-5 and 7-30 are believed to be allowable as well.

In view of the amendments and discussions presented above, Applicant respectfully submits that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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